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December 6, 2011

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station
Docket No. 50-269
Licensee Event Report 269/2010-02, Revision 1
Problem Investigation Program No.: O-10-6174

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), on October 6, 2010, Duke Energy submitted Licensee Event Report 269/2010-02, Revision 0 (ADAMS ML102860133). The submittal addressed a Unit 1 manual reactor trip due to incorrect indications of increasing reactor coolant pump vibration which occurred on August 7, 2010. This report has been revised to add the results of the cause analysis and corrective actions which were not identified in the initial report.

This report is being submitted in accordance with 10 CFR 50.73 (a)(2)(iv)(A). This event is considered to be of no significance with respect to the health and safety of the public. There are no regulatory commitments contained in this report.

Any questions regarding the content of this report should be directed to Corey Gray, Regulatory Compliance Group at 864-873-6325.

Sincerely,

TP Gillespie
T. Preston Gillespie Jr.
Vice President
Oconee Nuclear Station

Attachment

*TE22
LIR*

Document Control Desk

December 6, 2011

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cc: Mr. Victor McCree
Administrator, Region II
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. John Stang
Project Manager
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Washington, DC 20555

Mr. Andrew Sabisch
NRC Senior Resident Inspector
Oconee Nuclear Station

INPO (Word File via E-mail)

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Oconee Nuclear Station, Unit 1

2. DOCKET NUMBER

05000-0269

3. PAGE

1 OF 4

4. TITLE

Manual Reactor Trip due to 1A1 and 1A2 Reactor Coolant Pump High Vibration Indication

5. EVENT DATE

MONTH	DAY	YEAR
08	07	2010

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO
2010	02	01

7. REPORT DATE

MONTH	DAY	YEAR
12	06	11

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
None	05000
FACILITY NAME	DOCKET NUMBER
None	05000

9. OPERATING MODE

1

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

- | | | | |
|---|---|---|--|
| <input type="checkbox"/> 20.2201(b) | <input type="checkbox"/> 20.2203(a)(3)(i) | <input type="checkbox"/> 50.73(a)(2)(i)(C) | <input type="checkbox"/> 50.73(a)(2)(vii) |
| <input type="checkbox"/> 20.2201(d) | <input type="checkbox"/> 20.2203(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
| <input type="checkbox"/> 20.2203(a)(1) | <input type="checkbox"/> 20.2203(a)(4) | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(vii)(B) |
| <input type="checkbox"/> 20.2203(a)(2)(i) | <input type="checkbox"/> 50.36(c)(1)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(iii) | <input type="checkbox"/> 50.73(a)(2)(ix)(A) |
| <input type="checkbox"/> 20.2203(a)(2)(ii) | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | <input checked="" type="checkbox"/> 50.73(a)(2)(v)(A) | <input type="checkbox"/> 50.73(a)(2)(x) |
| <input type="checkbox"/> 20.2203(a)(2)(iii) | <input type="checkbox"/> 50.36(c)(2) | <input type="checkbox"/> 50.73(a)(2)(v)(B) | <input type="checkbox"/> 73.71(a)(4) |
| <input type="checkbox"/> 20.2203(a)(2)(iv) | <input type="checkbox"/> 50.46(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(v)(C) | <input type="checkbox"/> 73.71(a)(5) |
| <input type="checkbox"/> 20.2203(a)(2)(v) | <input type="checkbox"/> 50.73(a)(2)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(v)(D) | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> 20.2203(a)(2)(vi) | <input type="checkbox"/> 50.73(a)(2)(i)(B) | | Specify in Abstract below
or in NRC Form 366A |

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Corey Gray, Regulatory Compliance Engineer

TELEPHONE NUMBER (Include Area Code)

(864) 873-6325

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
X	AB	JX	Indikon	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO15. EXPECTED
SUBMISSION
DATE

MONTH	DAY	YEAR

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On August 7, 2010, at 1130 hours, while operating at 100%, Oconee Nuclear Station (ONS) Unit 1 received statalarm 1SA-9-D2 (Reactor Coolant Pump Vibration High). Operators entered the applicable response procedure to reduce Unit 1 power. Vibration readings continued to increase. At 1451 hours, with power at 17%, Control Room Operators manually tripped Unit 1 when the indicated vibration readings reached procedural limits. The post-trip response was normal, with all major operating parameters remaining within expected limits. Operators took appropriate action to stabilize the unit in Mode 3 (hot standby). While the operators were controlling Pressurizer and Letdown Storage Tank Level per procedure, the standby 1B High Pressure Injection (HPI) pump auto started due to low Reactor Coolant Pump Seal Flow.

Investigation revealed that a false high Reactor Coolant Pump (RCP) vibration indication occurred because the active power supply (Power Supply No. 2) had failed within the control module.

Corrective Actions included replacement of the Unit 1 control module (Indikon 500-IM22) and positioning the RCP vibration equipment Power Supply Selector switches to "Auto".

This event is considered to have no significance with respect to the health and safety of the public.

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NARRATIVE

BACKGROUND

The Unit 1 vibration sensor system senses motor / pump shaft vibration and motor frame vibration on the four reactor coolant [AB] pumps [P] (RCP). RCP 1A1 and 1A2 vibration sensor systems share a common power source which includes redundant power supplies [JX]. RCPs 1B1 and 1B2 vibration sensor systems share a separate common power source which also includes redundant power supplies. Both power supplies are contained in the control module. A three position switch in each control module can be placed in Power Supply No.1 position (up), Power Supply No. 2 position (down), or the Auto position (center). When set in the Auto position, Power Supply No.1 and No. 2 are auctioneered whereby Power Supply No.1 is the active supply and Power Supply No. 2 is the backup. However, at the time of the event there were no procedural controls to ensure that the power supply selector switch was properly positioned. Additionally, no Preventive Maintenance (PM) activities were established to ensure that the power supply was functioning properly.

There are three pumps per unit in the High Pressure Injection (HPI) [BG] System. Normally one pump (either A or B) is operating to supply both normal charging to the Reactor Coolant System (RCS) and seal injection to the Reactor Coolant Pumps. A second pump (A or B) is capable of starting manually via control room switch or automatically via a non-safety low RCP seal injection flow signal. The C HPI pump along with the other two HPI pumps will start in response to an Engineered Safeguards [JE] signal.

This event is reportable per 10CFR 50.73(a)(2)(iv)(A) because a valid Reactor Protective System (RPS) [JC] actuation, including a reactor [RCT] trip, occurred.

Prior to this event Oconee Nuclear Station (ONS) Unit 1 was operating in Mode 1 at 100% power with no significant activities in progress (e.g., testing, surveillance, maintenance, etc.).

At the time of the trip no safety systems or components were out of service that would have contributed to this event.

EVENT DESCRIPTION

On August 7, 2010, at 1130 hours, Unit 1 was at 100% steady state power and no work was in progress associated with RCPs when 1SA-9-D2 (RCP Vibration High) statalarm [IB] activated. The Unit 1 control room operator referred to the applicable alarm response guide and dispatched an operator to the RCP status computer. The operator reported that RCP status computer indicated 1A1 RCP vibration indication spiking.

At 1211 hours the Operations Shift Manager directed Unit 1 Control Room Operators to enter the appropriate Abnormal Procedure (AP) because of the high vibration indication on 1A1 RCP. In addition to the indication on 1A1 RCP, control room operators entered the AP at 1300 hrs due to indicated high vibration on the 1A2 RCP.

At 1435 hours control room operators began reducing Unit 1 power per procedure because of the increasing vibration trend. Station engineering began troubleshooting the cause of the statalarm. At 1451 hours, the reactor was at approximately 17% power, and the vibration readings of pumps 1A1 and

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NARRATIVE

1A2 reached the procedural limits requiring an immediate reactor trip. At this point control room operators manually tripped Unit 1 and secured the 1A1 and 1A2 RCPs.

The plant response during down power was normal and the post-trip response was normal. No actuation or actuation demands occurred related to emergency feedwater [BA] or engineered safeguards (i.e., Emergency Core Cooling, Containment Isolation [JM], Containment Spray/Cooling, and Emergency Power). A second idle HPI pump automatically started due to a non-safety signal for low RCP seal injection flow. The second HPI pump operated for a short period (per procedure) to maintain RCP seal flow. This is a routine action to compensate for post-trip RCS temperature and volume changes.

Troubleshooting results revealed that the power selector switch was in the down position, indicating that Power Supply No. 2 was the active power supply. Power Supply No. 2 was found to be failed. This power supply was feeding the 1A1 and 1A2 RCPs vibration monitoring system.

CAUSAL FACTORS

The root cause for this event was a power supply that failed in a manner that the vibration indications appeared to be valid. As a result Operations, initiated a unit shutdown and eventually tripped the reactor based on the invalid RCP emergency high vibration levels. Past operating experience was that the power supply would fail in a manner that was easily diagnosed. For example in June 2010, a similar power supply failed on ONS Unit 2. In the Unit 2 case, the vibration points on the Operating Aid Computer (OAC) status indicated "Bad" then "Good" such that operators were able to quickly identify that the indications were invalid.

CORRECTIVE ACTIONS

Immediate:

1. RCPs vibration sensor system power supply selector switches were set to "Auto" on Units 1, 2, and 3.
2. The control module containing the failed power supply was replaced on Unit 1.

There were no subsequent / interim Corrective Actions; however, the planned Corrective Actions to prevent reoccurrence are listed below. The below planned corrective actions are all completed.

1. Revise the applicable Alarm Response Guides (ARGs) to address actions to validate RCP high vibration alarms.
2. Replace the degraded power supply on Unit 2.
3. Establish a Preventive Maintenance (PM) program in accordance with industry best practices that accomplishes the following:
 - a) Defines a replacement frequency for the power supply.
 - b) Establishes a periodic PM to ensure the power supply is functioning properly.

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NARRATIVE

SAFETY ANALYSIS

The risk significance of this event has been evaluated. This event was an uncomplicated reactor manual scram with no impacts on any safety systems. All systems responded normally following the trip, no safety limits were challenged and the Unit was placed in Mode 3 without complications. Consequently this event was not considered safety significant.

No safety limits were challenged and shutdown was as expected for a manual trip scenario. Based on analysis this event has a low impact on core damage risk.

ADDITIONAL INFORMATION

It was determined by the root cause extent of condition review that the condition described in this LER was applicable to all three Oconee units. The necessary corrective actions were performed in the immediate and planned corrective actions to resolve this problem. However, on June 15, 2010 ONS Unit 2 2A1 and 2A2 RCP's had experienced a similar RCP vibration instrument failure. Troubleshooting determined that the cause for the sporadic RCP vibration indications was a faulty power supply as well. However this particular event did not result in a unit transient.

Energy Industry Identification System (EIIIS) codes are identified in the text within brackets [].

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event has been reported to the Equipment Performance and Information Exchange (EPIX) program. The failed component was a model 500-IM22 vibration monitor control module manufactured by Indikon Company Inc.